Map Design:
Graphic Design Basics

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Map design: Graphic design basics

1 Perception

Cartographers and design both use visual inter-human communication. In order to discuss graphic design, we have to deal with the topic of the communicating human. But to understand the communication process, first of all we have to speak about human perception.

Outer and Inner Worlds

What and how do people perceive?

Well, primarily people perceive their environment - the outer world. They see, hear, touch, smell and taste it. For that purpose they have perceptual organs. During the perception process all senses work simultaneously and therefore it is not easy to decide which sense is decisive for the occurrence of a reaction in a certain situation.

Take supper for example: Is the tasting sense dominating, because the meal is tasting deliciously, or the eye, because the table is nicely laid out, or the ear, because the conversation and the music are pleasing? Humans also permanently experience themselves, their inner world. The limbs and organs call our attention if they are exhausted or diseased. The soul, the psyche plays an important role deciding on the state of well-being. Humans feel, they perceive moods and instincts and know whether they are walking or sitting or doing something.

Perception overload

People’s inner and outer worlds impact upon them simultaneously and are perceived in conjunction. the perception process is a permanent state during every situation of life, impossible to switch off. It is impossible also for people to filter out a specific perception, as in addition to that they have to survey its environment; likewise they cannot switch off one particular sense. They can only try to concentrate on some specific aspect.

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Selection

The biggest part of all incoming stimuli is perceived subconsciously and this part decisively shapes us. To shield from a stimuli overflow people can try to perceive part of all information consciously, just big enough to be digested separately (selection). The perception process proceeds as follows:

- First of all people are confronted with a disordered general impression.
- Consecutively they select specific information (selection).
- They try to order them by looking at them consciously (synthesis).
- But simultaneously they discover new stimuli and try to integrate them in their system as well.
- Finally they receive an ordered whole, an overview. While analysing it a feedback process is initiated influenced by many components.

Processing

The designer intends to effectuate a certain reaction in the viewer (or customer).

What are the components of human perception that he has to deal with?

- The feeling is a spontaneous all-embracing personal reaction to a perception, responsible for actions.
- Needs are caused by a shortage and have to be satisfied immediately.
- Interest is controlled by the mind and aims on a field that is not covered by needs.
- Motivation is the conscious and subconscious combination of these components.
- Expectation is the more or less clear temporary objective we have in mind.
- Memory is a conscious or subconscious feedback factor.

2 Communication

The designer has to deal with the exchange of information, the communication. He must understand their functioning, the codes and languages. Only then will he be able to define the design goals.

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Communication

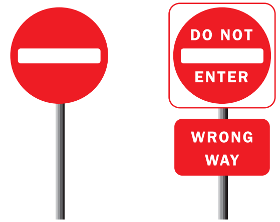
A simplified scheme of (visual) communication looks a follows:

The transmitter (the designer) communicates with the receiver (the viewer) by sending messages with the help of a language (here: pictorial language and written language). For that end he uses codes to transmit his message effectively. A picture, for instance, showing the sea, the sun and palm trees, is not only an image of the coast, but leads the viewer to further associations and can stand for recovery, relaxation, warmth, holidays etc.

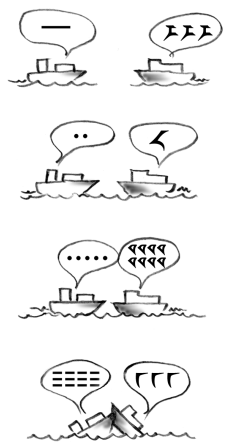
The cartographer uses codes with his symbols as well.

The symbol  not only stands for a letter, but also for a post office.

The symbol  does not only mean several trees and rain forest, but also tropics, humid-torrid climate, a certain flora and fauna etc.



2a A traffic sign whose meaning is known in Germany immediately is used in the USA with two explanatory texts.



2b The ships do not understand each other because they use different languages. Although the viewer cannot understand the dialogue he would be able to understand the course of events.

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Code

The code encodes messages. The receiver is able to understand the content only with knowledge about the code (Example: map legend).

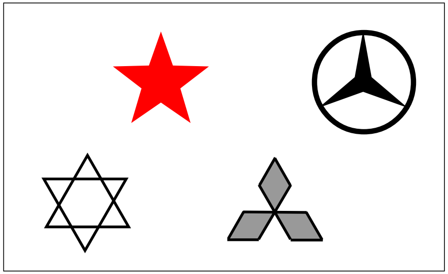
Every symbol has a certain meaning the receiver has to know.

The spoken language is a code as well: Someone may for instance understand German fairly well, French less well and Finnish not at all.

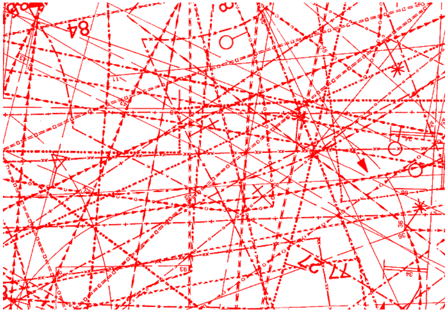
It may happen of course that two or more meanings exist for one symbol .

In maps, for example, the symbol + can stand for a church, a chapel, a graveyard or a rock.

Shaking our head is also codified: it means No to us, in Greece it means Yes.



2c Different stars; each of them has its own meaning that exceeds its pure geometric form.



2d: Someone can only use the pattern sheet if he knows its function and its signs.

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Languages

At the beginning of human history people understood each other through facial expressions and gestures or sounds.

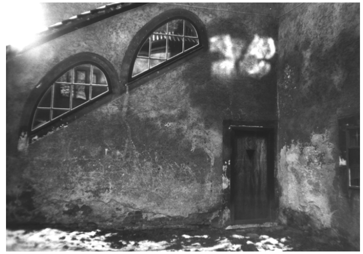
Information as discoveries, moods, desires or orders could be thus communicated.

Since the stone age linguistic signs are recorded permanently by engraving them in wood or painting them on stone walls. The signs were taken from nature.

In the 5th century BC schematic pictorial signs have been stringed together for the first time, enabling us to visualize trains of thought and courses of events.

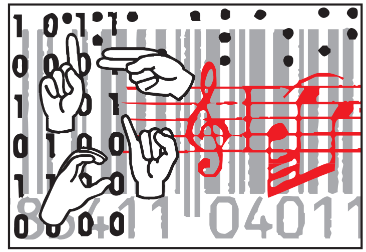
Now languages could be developed according to cultural expression and social requirements.

Sign-like pictures were combined to form sign language (e.g. the symbols on maps).



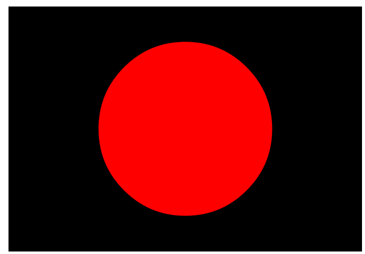
2e: Pictorial language: This picture comprises more than two windows, one door, two walls, the floor and a roof slope. It transmits a certain mood.

2f: Encoded: sign language, musical notation, braille, machine language, bar code .



2g: A possible communication goal: Attract attention.

Look here!



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Letters, that are symbols as well, were combined to form words and finally sentences: the written language.

Pictures such as photographs, illustrations and paintings have a pictorial language.

Beyond that further languages exist as sign language, braille, musical notation, etc..

Communication goals

The designer has to know exactly whom he wants to address and what he wants to impart. He has to respond to the receiver, his perception and his surrounding. He has to comb his design possibilities for suitable tools. He must use adequate methods, languages and codes.

A designer must be endowed with the following personal conditions:

- Sensibility and receptiveness,
- agility and creativity,
- ability for abstraction and analysis,
- ability for synthesis and
- ability to aesthetical organization.

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3 Design

After this quite abstract introduction the terms 'form' and 'design' will be used to conduct us to more practical topics.

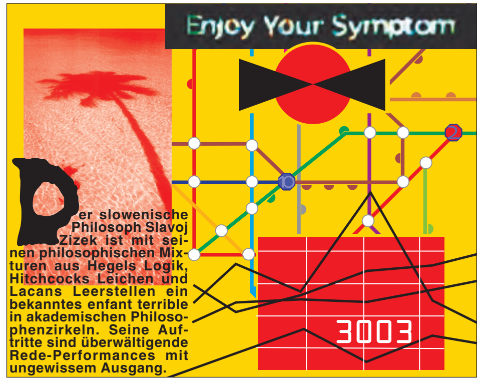
The form

The form is the composition, the result of the design process.

In this connection form (the whole thing) means more than the sum of the parts (Fig. 3a; c. Fig. 2e and the rain forest symbol from the previous chapter).

The form is even maintained if single elements are changed.

3a



A form cannot exist without its surroundings.

A form has something like a soul that has to be filled with life by the designer.

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Basic forms

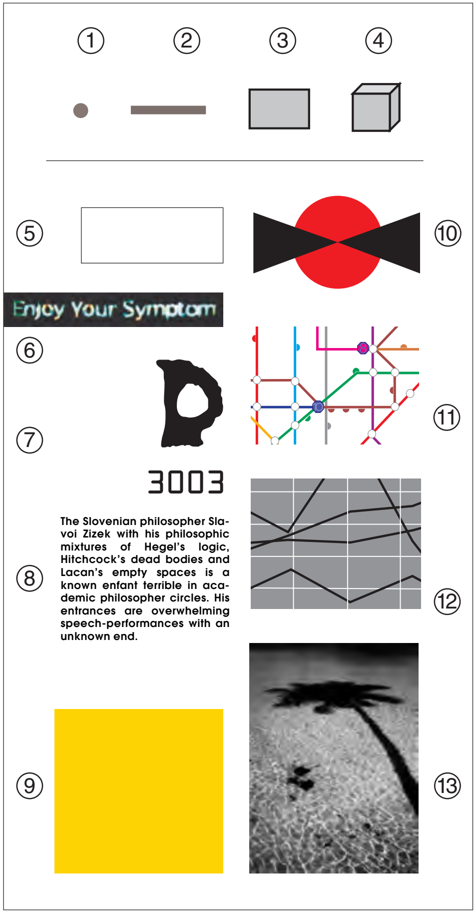
For the design one tends to fall back gladly on the elementary basic forms (Fig. 3b, upper row):

Point(1): In the true sense it is a zero-dimensional object and therefore cannot be represented. In graphic arts a point is that what is not yet a circle.

Line(2): A one-dimensional object, a stroke.

Area(3): A two-dimensional object, e.g. a rectangle, a circle, a polygon. The area has a form.

Volume/Body(4): A three-dimensional object that will not be dealt with at this point.



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Graphic elements

The elements can be simple, composite or complex (Fig. 3b, lower part):

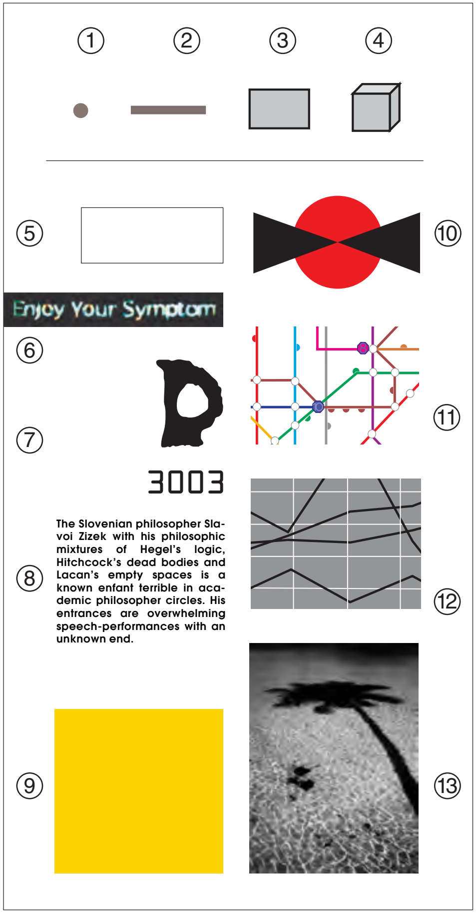
Sign(7, 10): A letter, a logo etc.

Writing(6, 8): Text in books, newspapers, on posters, in advertisements etc.

Graphic (11, 12): A diagram, a map, an illustration etc.

Picture (13): A photograph or a detail.

Background (9): The background, the surrounding, has to be included in the design even if it is merely white.



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Variations

The forms and elements can be varied by (Fig. 3c):

Structure: The inner arrangement of areal objects, as screens, hatches, patterns.

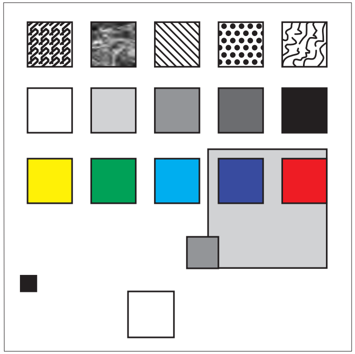
Tonal value: The brightness of objects.

Colour: Reaches the viewer directly, puts him in a certain mood, rouses feelings.

Size: To emphasize, to cause tension.

Position: The position of an object within a composition is of substantial importance concerning its effect.

3c



Design principles

It does not make sense to define rigid design rules because, as described above, graphic design is influenced by changing perceptions,

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changing communication methods and changing design goals.

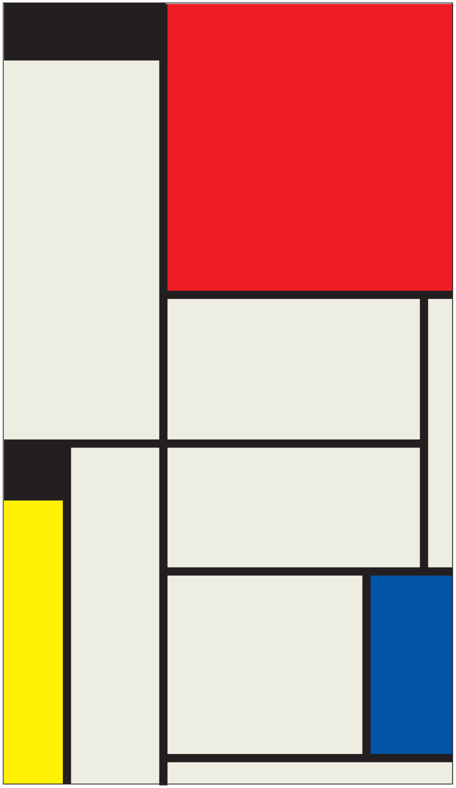
But the following principles (Fig. 3d) that guarantee a good and successful design should still be considered:

Proportion or the relation between single objects and their surroundings. Many attempts have been made to determine the ideal absolute proportion, but without success. Some models such as the golden section are considered as being almost perfect.

***Harmony**:* A design is harmonic when it is well ordered and when all internal elements have been combined properly according to an aesthetic sense, which means that nothing disturbs, tips over or drops out.

***Contrast**:* Every effect is based on contrast. Contrast creates tension and therewith the attention of the viewer. It is created through the use of contrast pairs: To be activated every object needs a counter object.

By the detailed inspection of countless design examples a designer should try to get a reliable flair for proportions, harmony and good design.



3d

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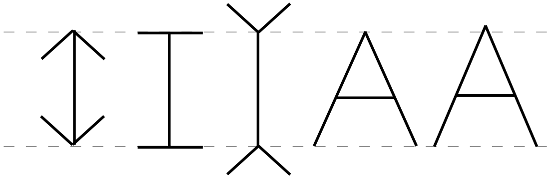
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4 Optical Illusions

Optical illusions are of particular interest due to their unexpected results and the effects thus achieved. They show again that the personal aesthetic experience is set above the strict geometric construction.

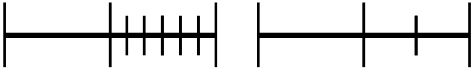
Lines

Fig. 4a demonstrates that vertical lines of the same length seem to differ in length if their added corners are changed. As a result sharp and round letters must jut out from the type line (Schriftlinie) so that they do not seem smaller than the letters D and T.



4a

Fig. 4b shows that repeatedly subdivided lines seem longer that undivided.



4b

In Fig. 4c thick narrow set lines appear shorter than the ones that are further apart. For that reason type faces with thin line gauges seem to be higher than that with bold ones.



4c

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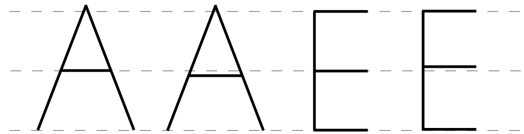
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The optic centre is not always the same as the geometric center, as shown by Fig. 4d.

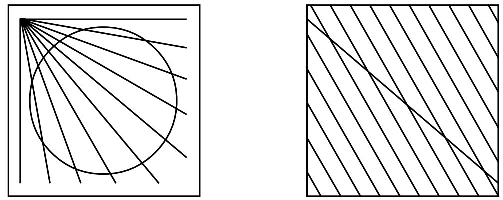
4d



The Futur type face has been constructed geometrically but was subsequently modified according to optic-aesthetic viewpoints. Because of that it appears calmer and more harmonic now.

Fig. 4e shows optical deformations: The circle seems dented and the single line repeatedly broken.

4e



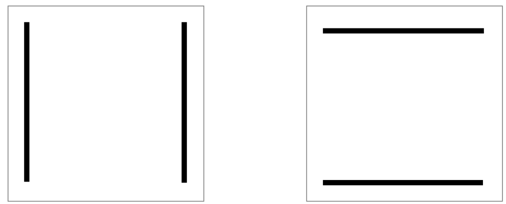
Areas

A square optically seems wider than higher. Therefore squares must be exaggerated vertically (Fig. 4f). The same applies to circles.

4f



4g

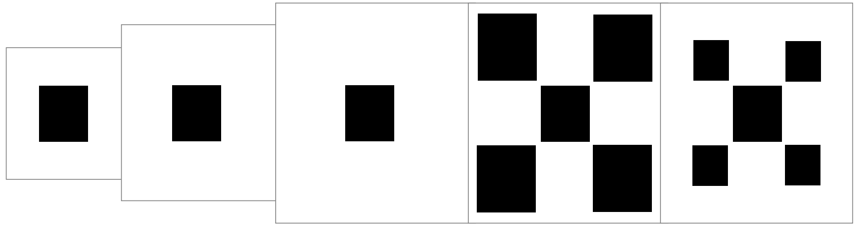


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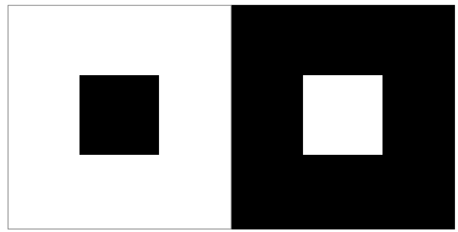
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In Fig. 4g the horizontal lines widen the square area whereas the vertical ones exaggerate it vertically.



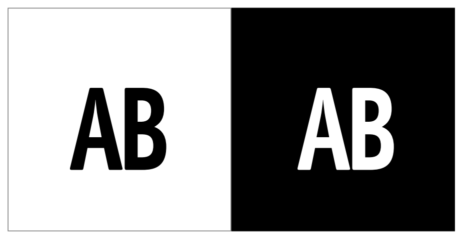
4h

In Fig. 4h all central squares have the same size. Their apparent size (the other squares and the white space) is influenced by their surrounding.



4i

In Fig. 4i and 4j the bright areas (or letters) seem larger than the dark areas (or letters) of



4j

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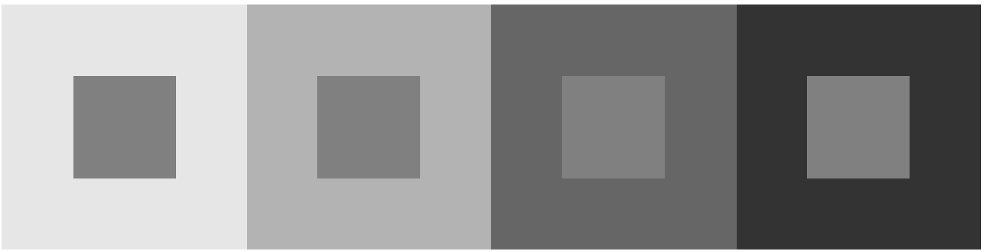
the same size because their brightness outshines their contour.

Tonal value

In Fig. 4k it becomes apparent of how little importance the actual brightness is (all inner squares have the same grey value). Their surrounding is decisive for the effect of the grey areas.

It is possible to create depth with the help of tonal values: the inner square in the left field seems to lie clearly above the surface area whereas in the most right one the black area seems to be a window.

4k

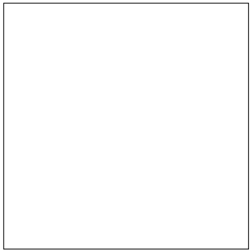


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5 The area

The area is the space for mounting the design. It should be sufficiently considered because the area more or less influences the elements arranged on it.

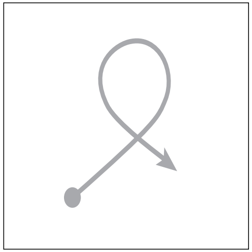


5a

Empty space / white space

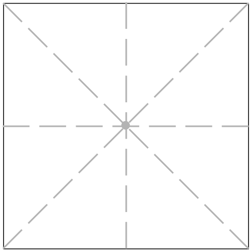
Some elements need a big area (empty space) to unfold. Empty spaces are fields of force.

A composition can appear disharmonious if the empty space is not incorporated. A design can be thrown out of balance or upset optically if the relation between printed and empty areas is disturbed. Empty space can create tension and dynamics in connection with design elements. It can order and emphasize them.



5b

Even a completely empty area is not empty for the viewer: he wanders around with his eyes (Fig. 5b, a typical reading loop), projects things on it and divides it into specific sub-areas (Fig. 5c).



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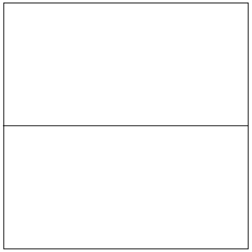
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Locations of effect

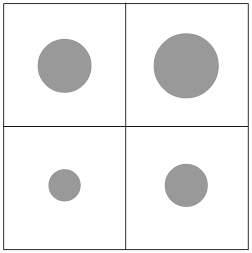
If an area is divided in the middle, the upper half seems to be larger than the lower half (Fig. 5d). Elements positioned in the upper sector seem more weighty than the ones below.

This has to do with the natural human field of vision. Above the horizon people expect just the sky which seems to be unlimited. This viewing habit is unconsciously applied to the area.

In the same way the left and the right side of the area have different meanings. The reading direction proceeds from left to right. People feel a movement mostly directed to the right. Therefore the right side is more important than the left one (Fig. 5e).



5d



5e

Effect

As a consequence elements get a certain meaning if they are located at a certain spot within

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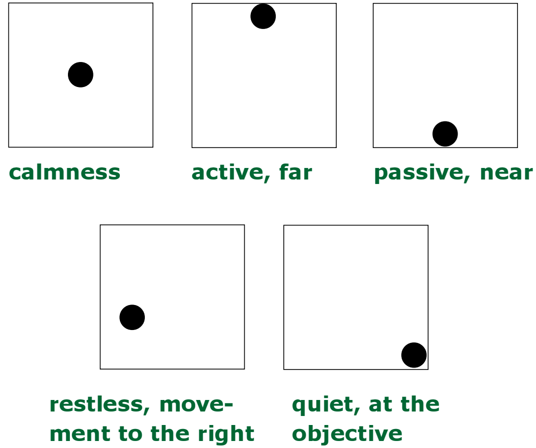
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the empty space. Points appear calm and stable if they lie on lines in Fig, 5c, but restless and dynamic off them (Fig. 5f).

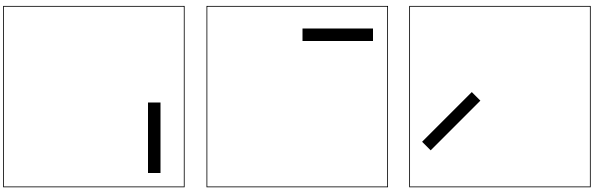
Lines have different qualities as well, depending on their location (Fig. 5g and h).

The effect can be described by adjectives as light, heavy, floating, unstable, rising, distant etc.

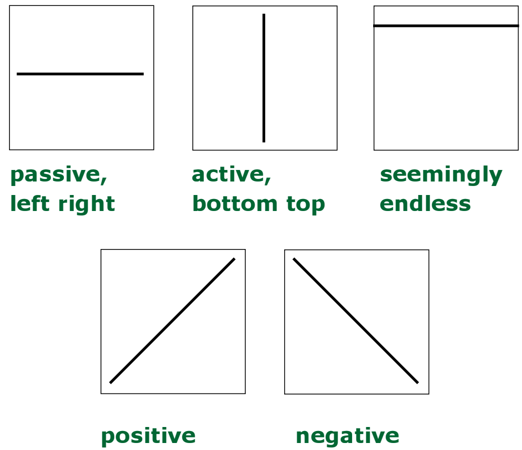
Fig. 5i shows different black elements on white areas with a specific effect in each case.



5f



5g



5h

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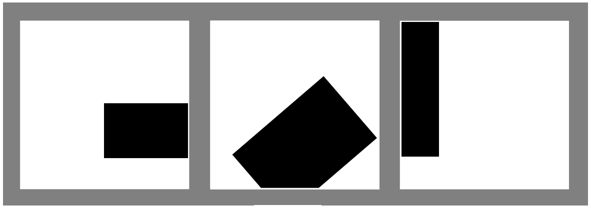
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Now, if one tries to look at the white spaces as new forms in their own right, that lie before a grey background, a new effect can be realized.

The general effect is changed by every new element within the design.



5i

Associative meanings

Empirical investigations have resulted in discerning specific associative meanings:

THE HORIZONTAL:	CLIMBING THE VERTICAL:	DESCENDING THE VERTICAL:	LEFT:	RIGHT:
horizon			passiveness	activity
sea	tower	plumb line	reflection	deed
steppe	obelisk	weight	introversion	extroversion
plain	fountain	heavy	past	future
calmness	powerful	serious	self	you
sleep				
death				
impressive				
important				
quiet				

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6 Area aesthetics

We have already spoken about the importance of the area as the mounting space. Now, the proportions, distribution and composition will be analysed.

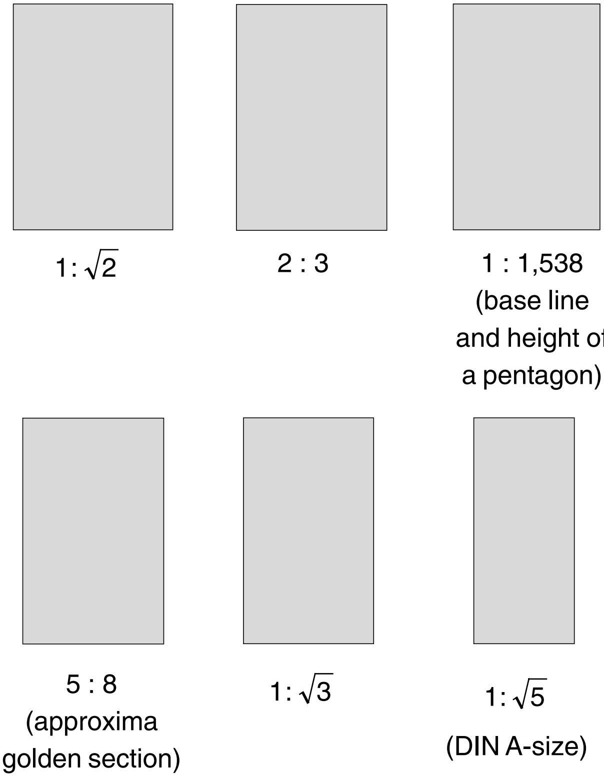
Size

Already at the beginning of the design process the designer has to decide about a page size.

The size and shape naturally depends on the purpose: Is the design object a map, a folder or a book?

There are shapes whose proportions seem to be especially well balanced, including the *golden section*.

Squares can look interesting as well if they are divided appropriately.



6a

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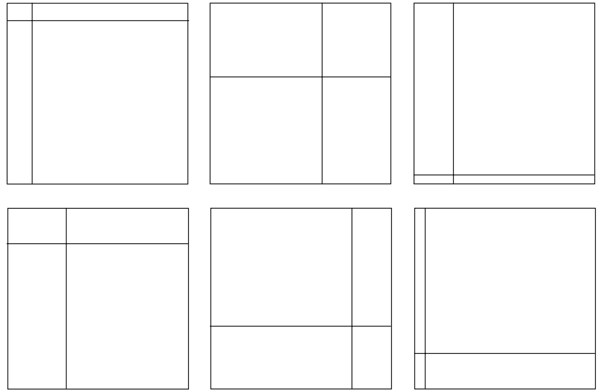
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Area subdivision

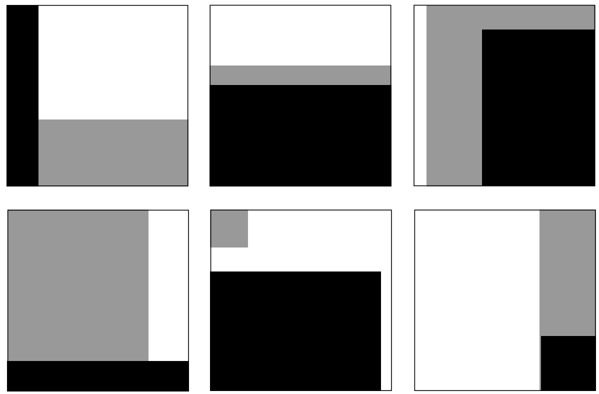
Depending on the size, the area can be subdivided according to the following principles, in view of the design purpose: Proportion, harmony and contrast. This results in a layout. Here a square has been chosen as the mounting space.

In Fig. 6b the area is subdivided by two continuous intersecting lines.



6b

In Fig. 6c the subdivision is realised by three different shapes that vary in size and tonal value. Moreover the shapes are arranged vertically and horizontally. This example shows the white area as an independent shape as well.



6c

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Composition

Fig. 6d shows a composition with simple shapes and their variation possibilities.

The necessary tension (contrast) is achieved by:

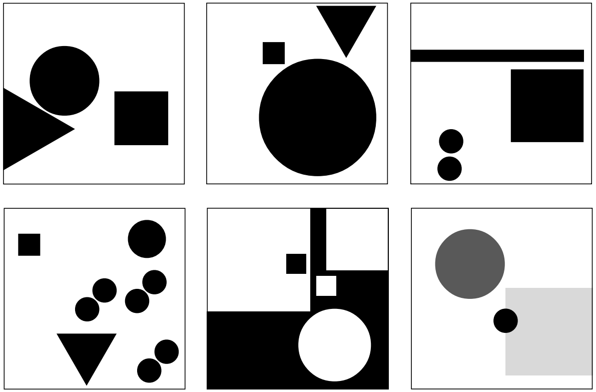
(Fig. 6d, upper row, from left to right)

- different shapes
- different sizes
- position within the area

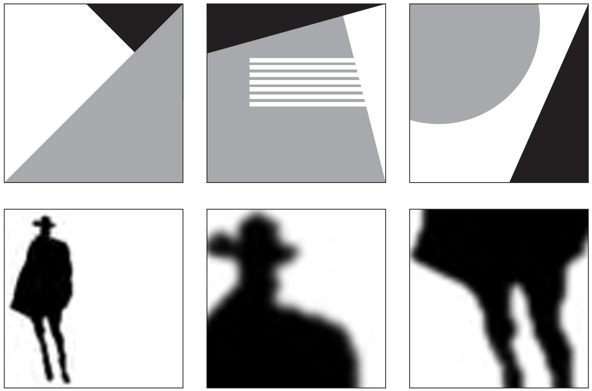
(Fig. 6d, lower row, from left to right)

- asymmetry
- negative – positive
- tonal value (brightness).

Fig. 6e shows a dynamic composition in which the elements are arranged in first slice, i.e. they extend beyond the format. They are cut at the margin and now obtain another interesting outline. Their real form can be reconstructed or rather surmised. The viewers complete the parts indicated or missing in their imagination.



6d



6e

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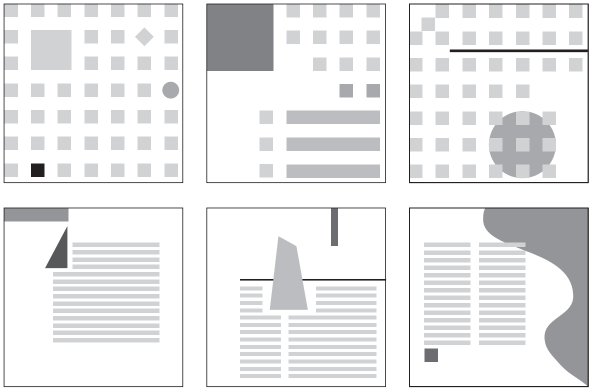
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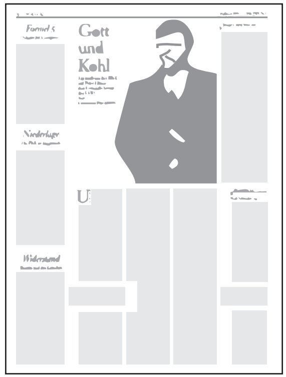
In Fig. 6f a grid has been constructed first at which the elements have been oriented. Different methods have been used to create tension. Now the composition is more complex, it combines different shapes, tonal values and sizes.

In Fig. 6g pages containing text are simulated. The different elements can be column titles, headings, initials, graphics and pictures within the layout of a map catalogue.

Classical *newspapers* (Fig. 6h) are a good example of area aesthetics because they have to manage with few design elements: Text and pictures are the principal design elements. Apart from them, lines and boxes are applied. Every page of a newspaper comes alive through the interplay between the text areas and the blank spaces: The reader *needs to be able "to breathe"* while reading.



6f



6h

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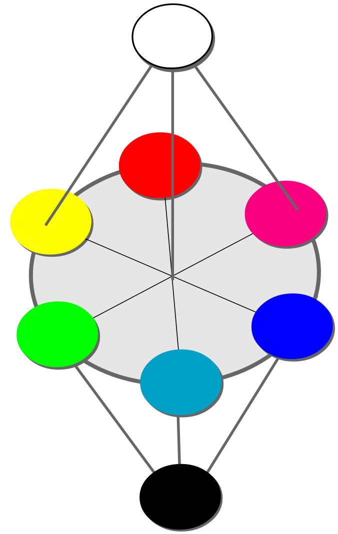
7 Colour

Colour is an important design element. It has an immediate impact on the viewers and addresses their subconsciousness.

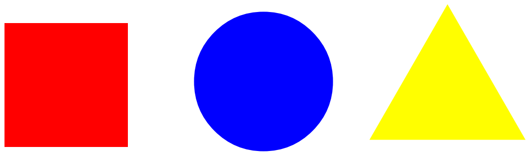
Colour psychology

The following characteristics are associated with certain colours:

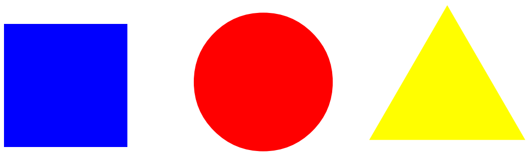
YELLOW: **expansion** **communication** **reason**	**RED:** **vivacity** **power** **imagination**	**BLACK:** **hopelessness** **darkness** **death**
BLUE: **introversion** **absorption** **intellect**	**ORANGE:** **health** **full of drive** **pleasure**	**WHITE:** **all possibilities** **glaring bright-ness** **birth**
GREEN: **immobility** **contentment** **sensuality**	**VIOLET:** **illness** **irresolute-ness** **melancholia**	



7a



Colour assignment after Wassily Kandinsky



Colour assignment after Oskar Schlemmer

7b

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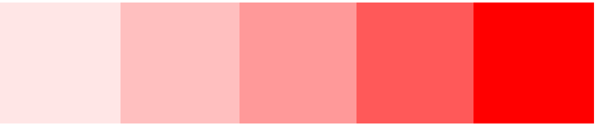
Of course this table is not universally valid. An essential factor is the personal colour sensitivity of the viewer: colours remind us of sensory impressions, put someone into a mood.

Gender and gender-specific roles of the viewers are just as important as cultural influences, e.g. fashion (*fashion colours*).

Therefore colours should be carefully selected and the colour experience of the target group should be taken into account.

Colour dimension (CIELAB-colour system)

A colour tint can be varied by the two factors brightness (Fig. 7c) and saturation (addition of white, black or grey; Fig. 7d)



7c
Colour brightness: 15% – 25% – 40% – 65% – 100%



7d
Colour saturation: 0% – 25% – 50% – 75% – 100%

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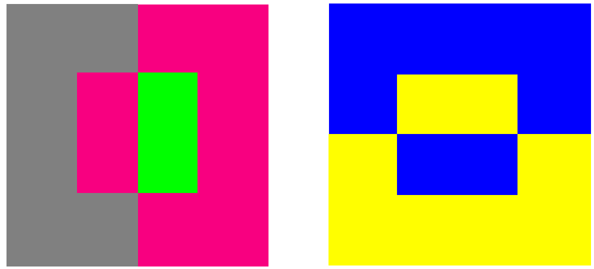
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Colour contrast

The relationship between colours is named colour contrast. When working with colours much can be learned about their characteristics, their effects and their interplay. A warm tonal value can suddenly become cold due to an adjacent tonal value. Harmonic compositions can abruptly change completely because of additional colour elements. The following types of colour contrast are distinguished:

- Complementary contrast

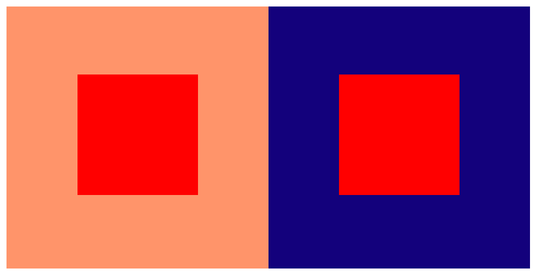
Colours which face each other in the colour circle are termed complementary. Each colour has its complementary colour with which it is balanced and even can increase to the highest luminosity (Fig. 7e).



7e

- Simultaneous contrast

Simultaneous contrast appears where a rich colour stands without its complementary colour (in which case the eye will generate this complementary colour), through which phenomenon its tonal value is optically changed (Fig. 7f).



7f

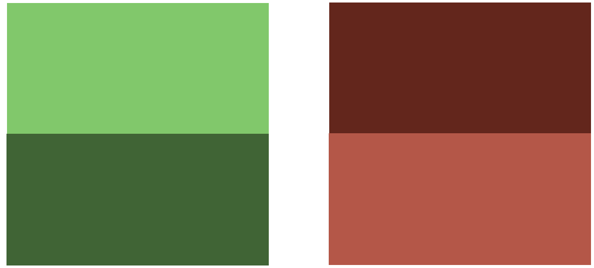
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■ Quality contrast

Quality contrast depends on the opposition between bright and dull colours (Fig. 7g).

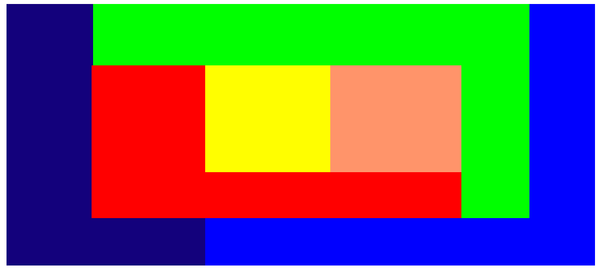


7g

■ Quantity contrast

Quantity contrast arises from the confrontation of differently sized colour areas (Fig. 7h).

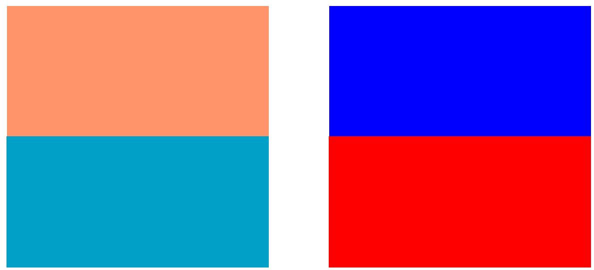
Here the intensity, the strength of a colour's brightness is of importance, e.g. yellow has a much bigger optical impact than violet. The order reads: yellow, orange, red, green, blue and violet.



7h

■ Cold-warm-contrast

The opposition between the red-orange and blue-green pair has the biggest effect on the contrast (Fig. 7i).



7i

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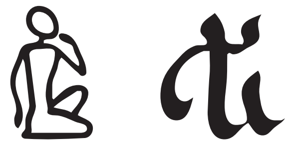
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8 Type aesthetics

Now type will be introduced as a new design element. In this section we look at type from the viewpoint of readability.

Evolution of type

Pictographic system: Letters have been created by imitating natural shapes. The symbol to the left in Fig. 8a was developed in Egypt approximately 3000 BC.



8a

Letters: The pictorial symbols became more and more abstract in the course of time and finally became letters: Fig. 8b Phoenician alphabet, approximately 1300 BC.



8b

Capital letters and serifs (Serifen): The letters in Fig. 8c are derived from the Greek /Roman alphabet between 200 BC and 300 AD. Special attention has been paid to aesthetics and proportions. Only capital letters existed. The Greeks did not use spaces between word or sentences.



8c

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The Romans invented serifs (Serifen) for aesthetic reasons.

8d



Lower case letters: Fig. 8d shows further development in the Middle Ages. With the "Karolinger Minuskel" lower case letters were first developed. Later on letters became narrow, heavy and angular (Gothic type).

8e



Roman type: At the rediscovery of classical antiquity the roman type originated around 1450, e.g. Garamond (Fig. 8e, left). The alternation between capital and lower case letters resulted in a better readability, because now several letters, so-called word images, could be registered simultaneously.

8f



Grotesque: At the end of the 19th century graphically reduced type faces have been developed. e.g. Akzidenz-Grotesque (Fig. 8f, left).

8g



Design fonts: Today good readability is now and then opposed by trendy type face creations (Fig. 8g).

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Screen fonts: Computers require specific font types that have been adjusted to the screen resolution (Fig. 8g, right).

8h



Geometry

Around 1920 characters have been reduced to the *basic geometric forms* rectangle, circle and triangle (Fig. 8h, Futura). However, since absolute geometry impairs readability, small modifications have been made.

8i



Letter spacing

Over 2000 years ago Greeks and Romans already dealt with the aesthetics of letters stringed together. They discovered that not only the shape of every single letter should be taken into account in order to obtain a good typeface, but also the blank space between the words.

The optic weight of the blank space between the letters must correspond to the inner space of the letter.

In Fig. 8i the blank spaces and the inner spaces of the letters are made clear through geometric forms.

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Fig. 8j shows a badly balanced word, because the spacing between the letters is exactly the same. The principle of geometric forms (in line 3) shows distinct harmonic disturbances.

In line 4 positive and negative forms have been balanced according to aesthetic considerations. The result is an in itself well proportioned word (Fig. 8k).

The harmonic balance of the letter spacing has to be considered especially when using graphic or big type faces.

To get a correct spacing no measurable values can be provided. The recognition of the size of blank spaces and the weight balance of words has to be practised in order to acquire an aesthetic competence.

It can be helpful to turn a word upside down, in order to recognize the forms and spaces unhindered (Fig. 8l). By the way, this method may be useful for each kind of design task.



8j



8k



8l

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9 Type composition

Following the analysis of letters and single words this section deals with the characteristics of typefaces in printed texts.

Grey value

When viewed from a distance a text block looks to be an image, a grey area (Fig. 9), related to a known degree to the surrounding blank space.

To keep the reading inhibition threshold small, the grey value of the text block should not be too dark, but also not too bright, because then the page would look to be full of holes. The grey value is determined by the line gauge, the letter spacing, the word spacing and the line spacing.

Reading process

The eye scans the lines erratically. It does not register single letters but whole words and

Grauwert: Aus einigem Abstand betrachtet, wirkt Text auf einer Seite als Bild, als graue Fläche; sie steht bekanntermaßen in Beziehung zum sie umgebenden Weißraum. Um die Lesehemmschwelle gering zu halten, soll der Grauwert nicht zu dunkel sein, aber auch nicht zu hell, da die Seite sonst löchrig wirkt. Er wird durch die Schriftstärke, die Laufweite, den Wort- und den Zeilenabstand bestimmt. Aus einigem Abstand betrachtet, wirkt Text auf einer Seite als Bild, als graue Fläche; sie steht bekanntermaßen in Beziehung zu dem sie umgebenden Weißraum. Um die

Grauwert: Aus einigem Abstand betrachtet, wirkt Text auf einer Seite als Bild, als graue Fläche; sie steht bekanntermaßen in Beziehung zum sie umgebenden Weißraum. Um die Lesehemmschwelle gering zu halten, soll der Grauwert nicht zu dunkel sein, aber auch nicht zu hell, da die Seite sonst löchrig wirkt. Er wird durch die Schriftstärke, die Laufweite, den Wort- und den Zeilenabstand bestimmt. Aus einigem Abstand be

Grauwert: Aus einigem Abstand betrachtet, wirkt Text auf einer Seite als Bild, als graue Fläche; sie steht bekanntermaßen in Beziehung zum sie umgebenden Weißraum. Um die Lesehemmschwelle gering zu halten, soll der Grauwert nicht zu dunkel sein, aber auch nicht zu hell, da die Seite

Grauwert: Aus einigem Abstand betrachtet, wirkt Text auf meiner Seite als Bild, als graue Fläche; sie steht bekanntermaßen in Beziehung zum sie umenden Weißraum. Um die Lesehemmschwelle gering zu halten, soll der Grauwert nicht zu dunkel sein, aber auch nicht zu hell, da die Seiten sonst sehr löchrig wirkt. Er wird durch die Schriftstärke, die Laufweite, den Wort- und den Zeilenabstand bestimmt. Aus einigem Abstand betrachtet, wirkt der auf einer Seite als Bild, als graue Fläche; sie steht bekanntermaßen

Grauwert: Aus einigem Abstand betrachtet, wirkt Text auf meiner Seite als Bild, als graue Fläche; sie steht bekanntermaßen in Beziehung zum sie umenden Weißraum. Um die Lesehemmschwelle gering zu halten, soll der Grauwert nicht zu dunkel sein, aber auch nicht zu hell, da die Seiten sonst sehr löchrig wirkt. Er wird durch die Schriftstärke, die Laufweite, den Wort- und den Zeilen

Grauwert: Aus einigem Abstand betrachtet, wirkt Text auf meiner Seite als Bild, als graue Fläche; sie steht bekanntermaßen in Beziehung zum sie umgebenden Weißraum. Um die Lesehemmschwelle gering zu halten, soll der Grauwert nicht zu dun

9a

groups of words. It jumps form one point of focus to the next one.

Texts should be designed so as to be interesting and not tiresome. Texts written in capital letters are difficult to read because word contours are blurred. Mixed type (with ascenders and descenders) offers satisfactory variation. The proportion of the type face is decisive for its readability. Lines should be perceived as bands, so that the eye will not skip away. A line should comprise a maximum of 50 – 60 letters (about 10 words). The longer the line, the bigger the

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line spacing should be. A type must be adjusted to the intended purpose. Specific type exist for a book setting and for headings.

Type face selection

Every type imparts associations (Fig. 9b). Therefore target groups (scientists, customers, holidaymakers...) are decisive for the selection of the type face. Here as well only recommendations can be made (Fig. 9c).

Eintritt verboten	Eintritt verboten
Weinkellerei	Weinkellerei
Staatsoper	Staatsoper
München 31 km	München 31 km
Fortschritt	Fortschritt
Feine Seide	Feine Seide
Stahlbau	Stahlbau
Buchhandlung	Buchhandlung
DJ HipHop	DJ HIPHOP
HOTEL EXCELSIOR	Hotel Excelsior
Speisekarte	Speisekarte
Parfum d'amour	Parfum d'amour
Bananen 1,29	Bananen 1,29

9b: left: wrong type face selected; right: correct choice

9c

PURPOSE	CHARACTER	TYPE E.G.
beauty culture, fashion	elegant-fashionable	Bodoni, Avant-Garde
food articles	traditional	Different type faces
technique	neutral	Garamond, Akzidenz
Hi-tech	elegant, plain	Gill, Bodoni
art, photography	neutral-elegant	Grotesque, Copperplate
fiction	classical, approved	Janson, Bembo, Caslon
professional literature	factual-neutral	Garamond, Egyptienne
business reports	factual-elegant	Futura, Bodoni, Univers
transportation	informative, quiet	Frutiger, DIN-types
letters, business cards	functional, elegant	Copperplate, Meta
street party	rustic, slogan-like	Berlin grotesque, Revue
poster	strong, slogan-like	Rockwell, Aachen
décor	playful, romantic	Plaza, Avant-Garde
sixties	factual, neutral	Helvetica, Akzidenz
seventies	colourful, vivid	Hobo, VAG Rounded
modern media	aggressive, provocative	new types

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Type face mixture

Type faces should only be mixed if they have different functions (as e.g. continuous text, headings) or rather different positions within the layout (e.g. inserted headings, columns).

The type faces used (Fig. 9d) must look alike regarding style, line gauge and geometry (relation of x-height to the height of the ascender), but still differ sufficiently to prevent any impressions of type setting errors. To put mixed type faces right next to one another might cause problems.

Garamond and **Frutiger** go together
Times and **Helvetica** go together
Garamond and Akzidenz-Grotesk go together
New Century and Futura go together
Rockwell and **Frutiger** go together
Palatino and Avant-Garde go together
Walbaum and Benguiat don't go together
Garamond and Times don't go together
Bernhard Modern and **Antique Olive** don't go together
Gill and **Frutiger** don't go together
Garamond and **Caslon** don't go together

9d

Compositions

Type faces can be varied by:

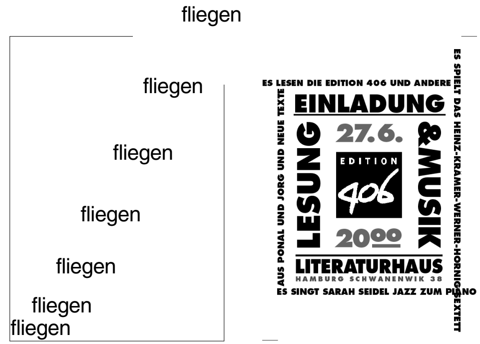
- type style and size,
- type shape (bold or italic),
- initials, headings and inserted headings,
- unjustified setting and justified setting.

For this the correct (sensible, aesthetic) application of the resources is of paramount importance. Pictures, lines etc. have to be purposefully employed as well. Fig. 9e shows a poem designed by Ernst Jandl and next to it a typo-

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graphic sketch of an invitation card for an event. The inner rectangle stands for getting together at one place and functions as an eyecatcher simultaneously. Fig. 9f shows a page layout that uses very few elements and still has originality.



9e

Typographic errors

Unfortunately typographic errors are found frequently:

- inadequate word spacing ("holes" in the text),
- lines too long,
- wrong line spacing,
- inappropriate type faces,
- isolated lines of a paragraph at the end or at the beginning of a page (windows)
- nasty divisions (Fig. 9g),
- inadequate contrast,
- too small blank space,
- too many type faces, elements, styles,
- playing around with the computer (Fig. 9g)



9f



9g

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10 Signs

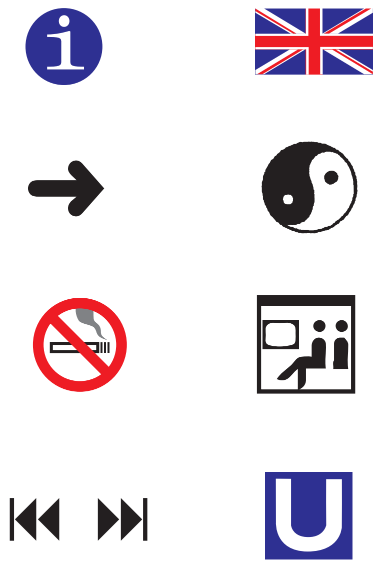
A sign is a visual expression of information, of an idea, of an occasion or of a form that has been reduced to the essential.

Communication

If someone says: "Give me a sign when I have to begin," he expects, that it will be shown clearly and unmistakably in its meaning.

Signs not only consist of gestures. The signs that we are actually speaking of can be found everywhere: in the streets, in buildings, in business life, on flag poles (Fig. 10a).

Every graphic shape of a sign conceals a certain meaning, revealed only to someone who knows the accompanying code system.



10a

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Types of signs (Fig. 10b)

symbol: refers to idealistic facts, e.g. the cross of christianity.

elementary sign: formed from basic geometric shapes (cf. Fig. 3a)

pictorial sign: graphic representation of an object.

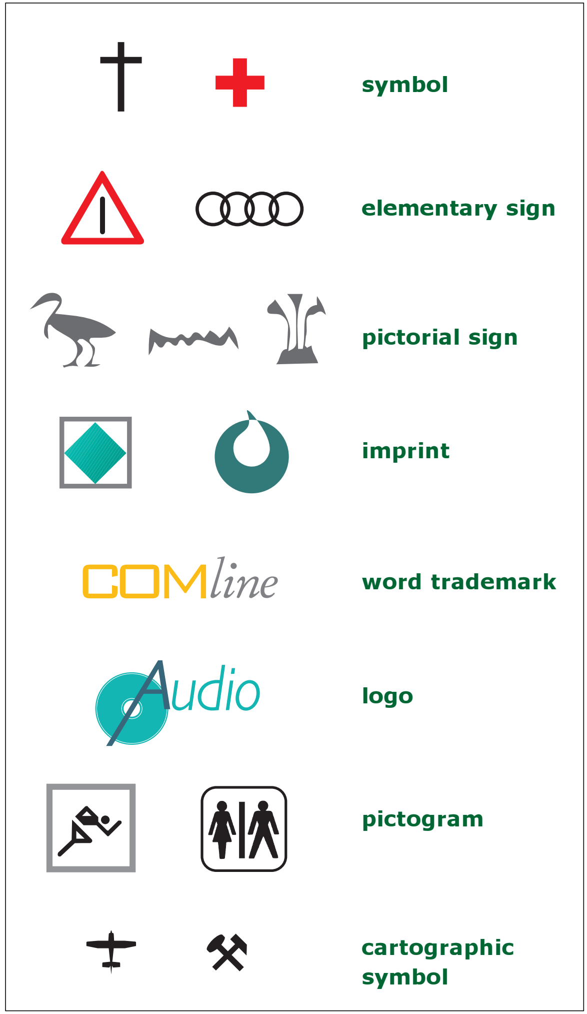
imprint: graphic trademark of a company or a product.

word trademark: A sign of a company or product only made up of letters.

logo: pictorial or verbal trademark of a company.

pictogram: strongly simplified pictorial symbol for an object or a situation with an internationally defined connotation.

cartographic symbol: symbol on maps.



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Function

Signs can have different functions:

- message, hint, warning (traffic sign, pictogram),
- product, service, image (trademark),
- tradition, origin, relationship (coat of arms, flag),
- association, reference (symbol, cartographic symbol).

Trademarks

In our consumer society trademarks are not only identifiers for companies, their products or services. They also carry certain messages regarding lifestyle, social affiliation, sometimes even ideologies.

Therefore it is important to know that a trademark does not only inform on a factual basis but also addresses the customer emotionally, so that a desire to buy the product or getting served is produced.

Design

Requirements for the shapes of signs:

- quick and unequivocal to recognize,
- concentration on the essentials,
- easily remembered, original and unmistakable
- fusion of the graphic components to a whole,
- equivalence of graphic form and meaning of the content.



10c

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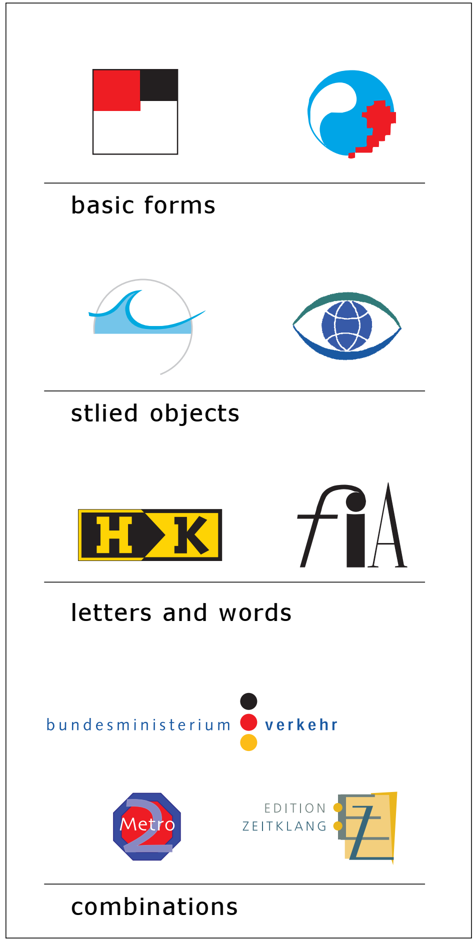
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To find a shape

First of all the function of the sign must be defined before the suitable concepts and images are collected during a brainstorming session. The ensuing data collection has to be ordered and examined for its suitability. Then the elements selected must be formally reduced until an effective sign has been developed that also meets aesthetic demands.

During the process of finding a shape the following paths can be treaded (Fig. 10d):

- proceed from basic shapes (circles, rectangles, triangles) or their derivations,
- simplification, abstraction and stylization of the element that forms the basis for the sign,
- modification of an existing sign (copyright has to be considered),
- choose letters and words as the basic idea.



10d

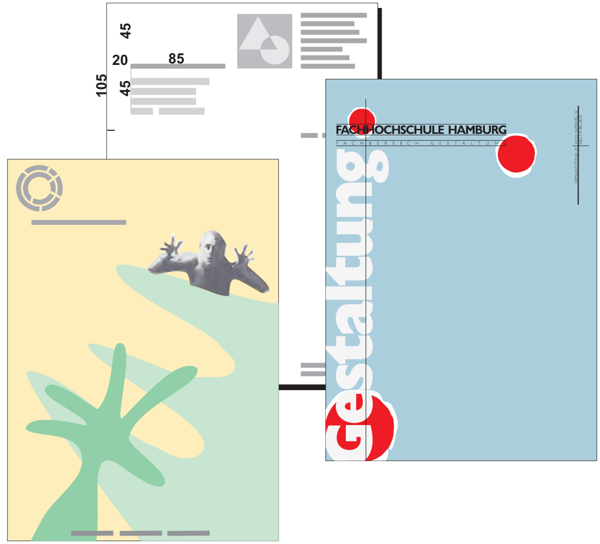
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11 Publications

The design of a publication requires a complex graphical understanding, because all elements have to match with each other concerning their effect. Where paper is used the sense of touch has to be considered: e.g. a book must also feel good.



11a

Notepaper and visiting cards

A company or a person represents itself publicly by such printed products. A decisive first impression is generated by them, which touches upon the image it wants to project. Therefore, first of all some basic questions have to be put, such as: Who am I? What do I want? How do I want to look? What do I want to achieve?

Company notepaper is subject to certain standards (Letter window, folding, etc.; see Fig. 11a above). But on the other hand there are almost no limits to the individual design. Every paper size and every stylistic device may be used.

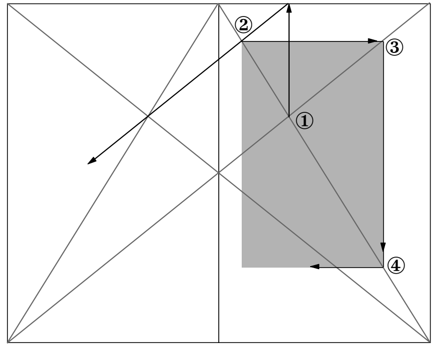
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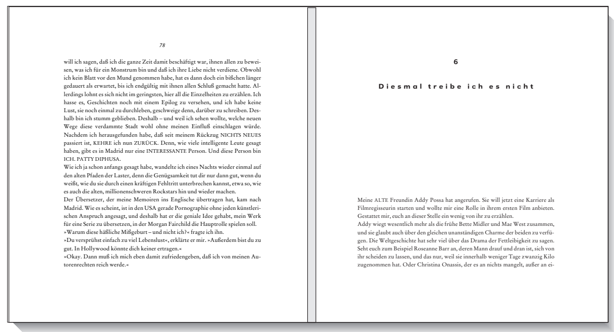
Books

Books are different from single pages as in books we have to proceed from the opened up spread concerning the type area and the margin proportions. Type area and page size should stand in harmony to each other. With the help of the golden section a good result can be achieved in this case as well (Fig. 11b). Unusual formats require individual solutions (Fig. 11c).

A further peculiarity of books is their general principle of design. French title, table of contents, text blocks etc. have to be treated stylistically in the same way.



11b



11c

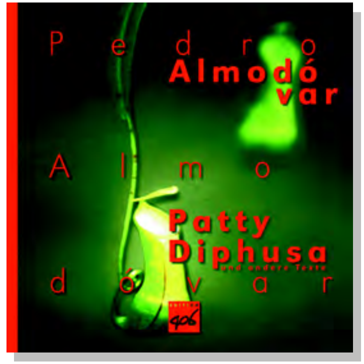
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Dustjacket

The dustjacket or cover (Fig. 11d) more likely functions as an advertising medium. It is subject to the same design principles as the poster. It should harmonize with the inner design.



11d

Magazine

Magazines (Fig. 11e) differ from books in the possibility to design every article in a new way. But in doing so the overall concept has to be maintained. Although if you browse through a magazine its design may appear varied (a magazine on exclusive fashion gives another impression than one on jeans fashion) - the overall image will remain upright and uniform.

Of course its stock of elements is bigger than that of a book; additional elements are pictures, graphics, illustrations, lines, headings, subheadings, headlines, initials etc. Here it is essential as well that all these elements have to be coordinated page after page.



11e

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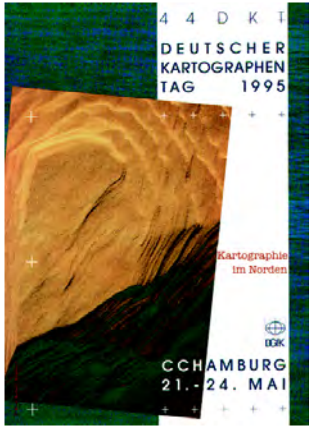
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Poster

Posters sell ideas, products or events (Fig. 11f). They should be composed clearly and unequivocally, because passers-by will often have just a short look at them. But they can also be complex and profound if they are conceptually designed in such way. Mostly posters are a combination between pictorial and text elements. The pictures often stand in the foreground; if the type is emphasized it may also become a picture. Because of the big size of posters the elements may strongly vary in dimensions.

11f



Packaging

Packages (Fig. 11g) were meant originally only to protect a product; nowadays they have an important advertising function. They should evoke positive notions or emotions. The buyer subconsciously transfers the optical presentation of the product to its quality characteristics.

In the package the third dimension plays an important role as a new graphic design factor, but it will not be further dealt with in this context.

11g



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12 Map symbols

A map is an information system; a complex combination of different symbols.

Symbol system

Every map symbol contains information that is coded. It conveys a message about itself, e.g. "I am a church", as well as about its relation to the other map symbols: "I am a church and stand in the center of a village called... that is located on the river ... in the landscape ... etc." (Fig. 12a)

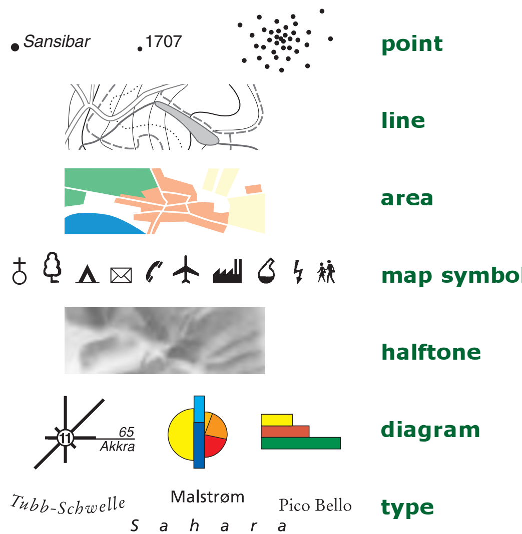


12a

Symbol types

Map symbols can be subdivided on the basis of their shape (Fig. 12b):

point: Represents the exact location of a single object or (if they are accumulated) an amount of objects



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line: Boundaries of regional objects or (if the scale does not permit this) median lines of narrow objects.

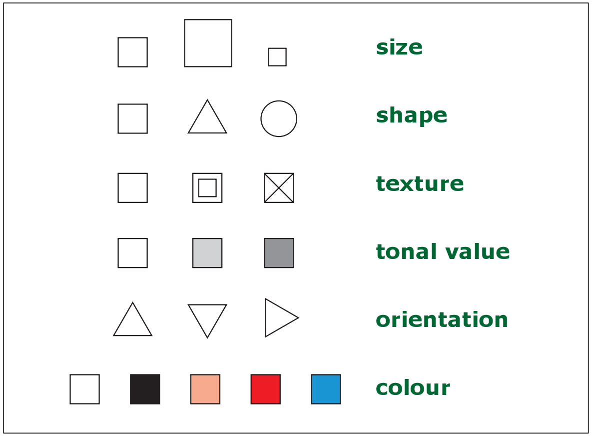
area: Characterizes regional objects as well as value classes, e.g. contour zones.

map symbol: Abstracted (pictorial) symbol that is used depending on the scale.

halftone: Areas which have changing tonal values, e.g. hill shading and aerial photograph.

diagram: renders statistical quantities; it may, similar to a symbol, refer to a point location or to an area.

type: Explains the map or its symbols.



12c

Variations

To make differentiated statements, symbols are varied graphically (Fig. 12c):

- size: suitable to emphasize (quantity).
- shape: associative differentiation (quality).
- texture: most quantitative differentiation.
- tonal value: quantitative differentiation as well.
- orientation: spatial and temporal orientation.
- colour: versatile use for associative, qualitative (hue) and quantitative (saturation) differentiation.

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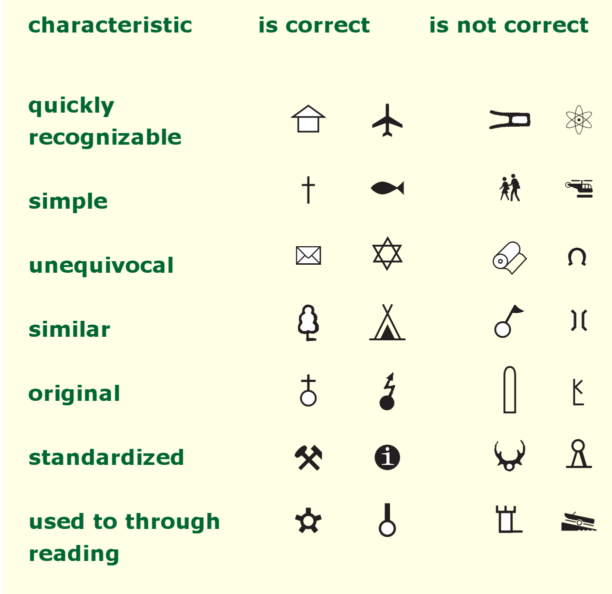
Design

Map symbols are subject to the following graphical requirements :

Quick and easy recognition, simplicity, unequivocalness, similarity to the object and originality (Fig. 12d).

Moreover the standardization of symbols in similar map series has to be considered as well as the reading habits of the map user.

To ensure the readability minimum sizes have to be kept; for this also the typical shapes have to be paid attention to.



12d

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Map symbols

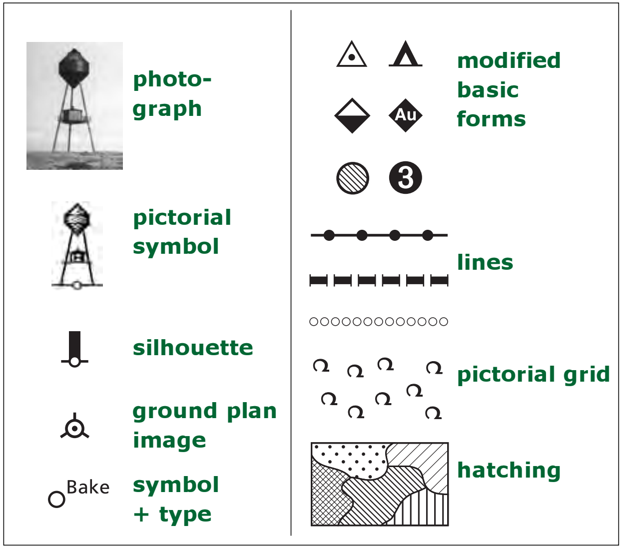
There are different kinds of map symbols (Fig. 12e):

- Pictorial Symbols: ground plan images, elevation images and image signs.
- Geometric Symbols: basic forms, lines and pictorial grids.
- Alphanumeric signs: figures, letters.

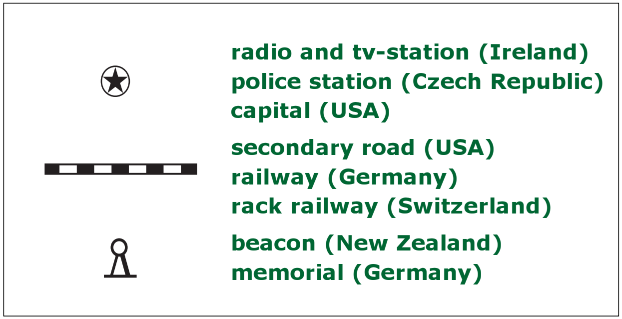
Their arrangement can be localized (preservation on the map, within the limits of generalization, of the correct location of places or area.), linear (as single line or area contours) or area like (regularly or irregularly distributed over an area).

Although they should be easy to associate, symbols have to be explained in the legend.

Especially the use of foreign map series requires the reading of the legend because familiar symbols can have a different meaning (Fig. 12f).



12e



12f

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Type

Type may vary in position, thickness, width, but as well in size, colour and letter spacing (Fig. 12g).

Type is used either independently or as an explanatory addition to a symbol; it can also be used over areas.

Type should have a good readability, should be distinguishable and be in harmony with the map layout. It should adapt to the nature of the objects that are described by it.



12g

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13 Map design: Graphic structure

The design of a map requires the consideration of some aspects of the graphic structure.

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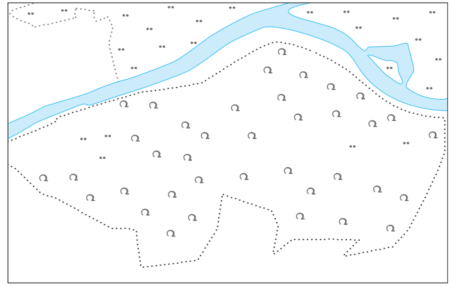
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Image of nature

For the map (as an image of nature) a representation should be chosen in a way that the objects and phenomena of nature and culture (scale dependent) are represented appropriately.

A map transfers the image of nature by a defined code to the imagination of humans. It is the successful interplay of different point, line and area symbols that allows the viewer to obtain a precise and correct image. Similar to the interrelationship of geographic objects the symbols that represent them on the map should be connected (Fig. 13a-c).

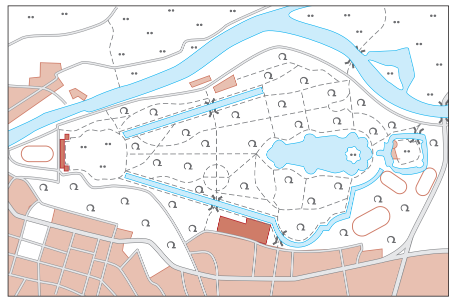
A quick perception of the overall picture has to be ensured; after that a detailed reading of the map is possible. Therefore the pictorial language should be as self-explanatory as possible.



13a Hydrography and vegetation ...



13b ... or hydrography and road system ...



13c The park on a city plan ...

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Purpose of the map

Apart from design experience the cartographer must have enough thematic expertise and precise knowledge about the subjects that have to be represented.

The purpose of the map is decisive. Different purposes call for matching contents and appropriate methods of representation (Fig. 13d, e). However, the design aesthetics must be maintained in any case.

An exact preparatory work is essential. The geographic extension, the page size, the map projection and the scale have to be defined. The map content, the map elements and the method of representation (legend and style sheet) have to be definitely defined as well. The thematic message has to be precisely formulated.



13d ... does not nearly characterize a park



13e ... and for a travel guide

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Legibility

The combination of single elements most favourable for perception is the one that results in a compact, stable, logical and simple overall shape (terseness).

The number of representation methods should be limited to a minimum so that complex subjects can be perceived quickly as well.

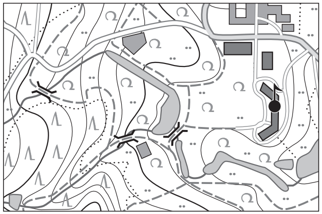
However, the information conveyed must not be falsified.

Concerning the legibility of the map the following principles have to be considered:

Graphic differentiation: The spectrum of graphic design possibilities should be applied meaningfully (Fig. 13f).

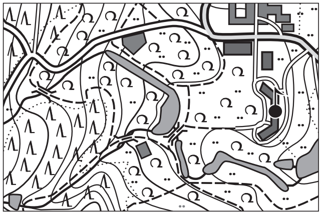
Graphic density: The optical overall impression must not be too heavy (Fig. 13g).

Contrast/object separation: Clear separation of elements, tonal values and colours; objects have

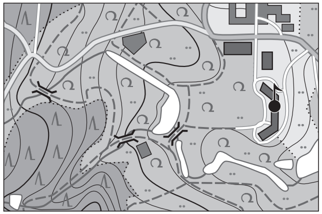


The influence of

13f differentiation, ...



13g ... density ...



13h ... and contrast

on the map aesthetics

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to be surrounded by an empty space to separate them from background elements (Fig. 13h).

Maintenance of the context: Structures and arrangements should be recognizable (Fig. 13c).

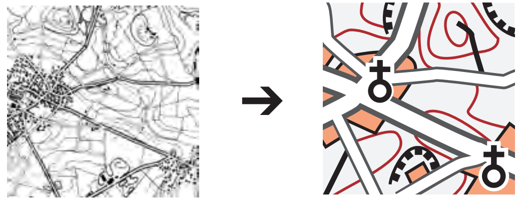
Habits/expectations of the map reader have to be considered.

Assessment principles

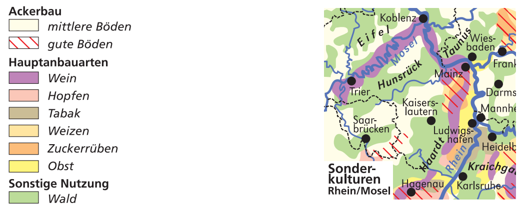
Even if it seems to be obvious, the following points have to be taken into account for the map design:

- Important things should be preserved and irrelevant things should be omitted (Fig. 13i, scale dependent generalization);
- Typical things should be emphasized and atypical things toned down (Fig. 13j, special crops in the Rhein-Mosel area).
- Equal things should be equal, different things should be different and opposite things should look opposite (Fig. 13k, map of the world religions);

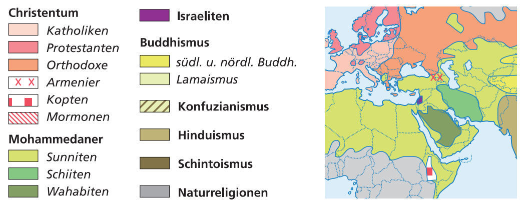
13i



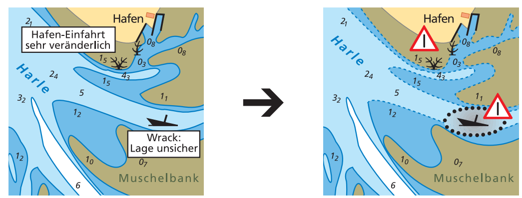
13j



13k



13l



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- Uncertain things should look uncertain and vague things vague (Fig. 13l, sea chart containing information about dangers).

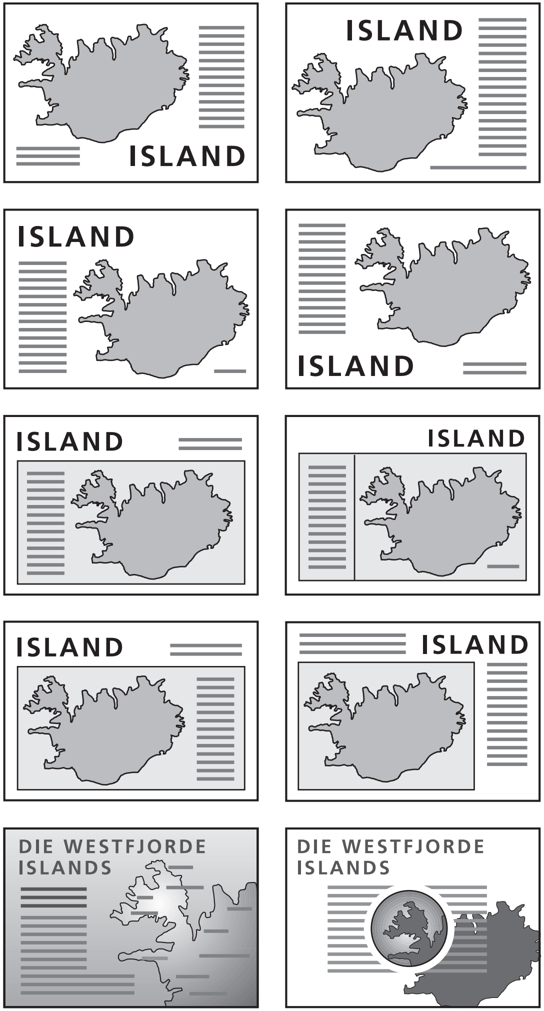
14 External map design

A map that comprises not only the map face, but also the title, the scale, the linear scale, the legend and possibly additional marginal elements, must have a good overall design.

Principles

A map is only readable and usable if all known design principles, above all the clearness and logical composition of the elements, are maintained: all its components are necessary for the understanding and therefore should communicate with each other well.

All elements should appear on the sheet in a suitable size and should be carefully arranged (Fig. 14a). Enough white space should be preserved as well.



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Main components of a map:

- map (map image, graticule, margin, border line),
- map title,
- scale and linear scale
- legend.

Further components:

- author, manufacturer, logo, year of publication, printing office
- reference to topographic source material
- auxiliary map(s)
- title page
- compass card, etc.

Map title

The title serves as the entry into reading the map content. The subject represented should be formulated exactly and tersely. If this is not possible sub-titles are necessary (Fig. 14b).

Graphically the title should on the one hand catch the eye, but also harmonize with the other



14b

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components of the map. The types used within the map should match with each other.

Scale and linear scale

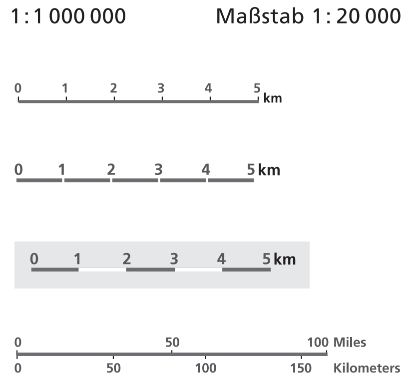
The map scale should correspond to the geographic region represented, the purpose of the map and the subject.

It should neither pretend to an accuracy that cannot be represented graphically or in content, nor should it be too small, so that information is too coarse and even becomes useless.

A too heavy linear scale should be avoided (Fig. 14c).

It has to be considered that the numerical scale may change between the first draft and final publication; the graphic scale will always change proportionally and remain correct.

14c



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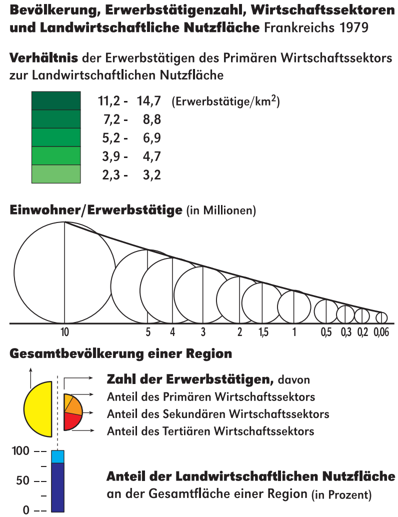
Legend

The formulation of the legend takes place right at the beginning of the map compilation. The legend comprises the program for the map to be created. Content-wise it has to overlap with the map. It has to be ascertained whether all map elements should be explained by the legend or if certain previous knowledge of the map reader can be assumed.

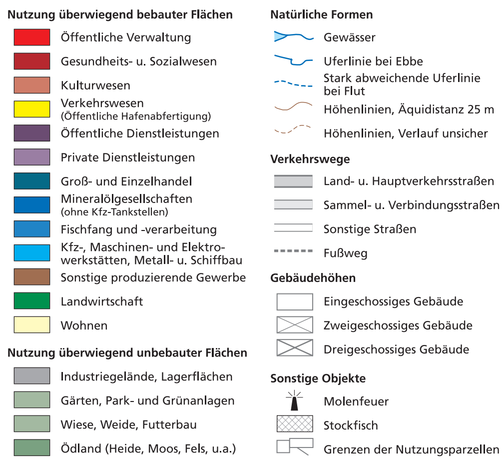
The legend should be clear, concise, lucid and guarantee a quick reading of the map. Extensive legends must be structured technically and graphically (Fig. 14d, e).

The legend should have a graphical density similar to the map.

The word "legend" is mostly unnecessary. Whether the legend is positioned within or outside of the map face depends on the available space, the folding and the overall layout.



14d



14e

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Title page

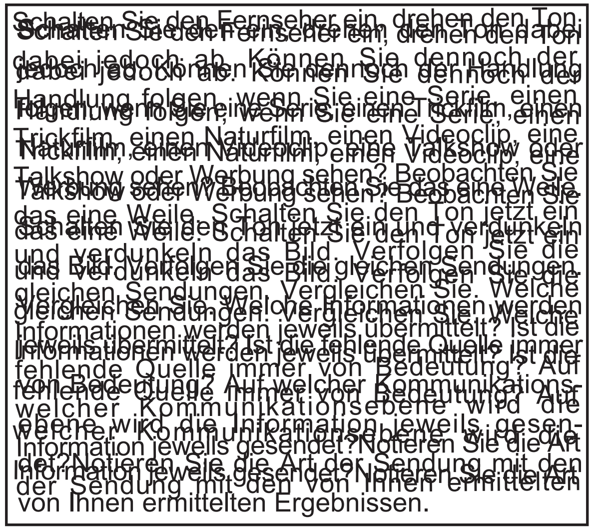
The title page has an important function for advertising. As goes for the book and the book jacket, the title page should be designed in harmony with the accompanying map.

15 Exercises

Perception

You are at a very loud place (disco, pub, construction site, department store). Stay there for a while and try to be aware what affects you from outside, what you hear, see, feel, in which intensity, for how long. Try to filter out details. What do you perceive of yourself? How is your mood? Does it change? Do you eventually perceive silence in this deafening noise? Do desires arise? For what?

Try to remember everything and make a note of it later at your leisure.



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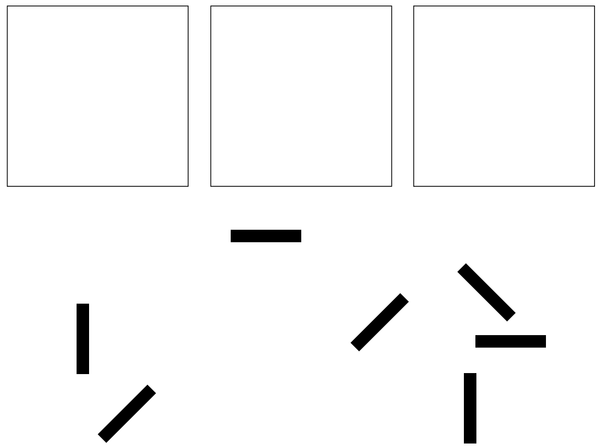
Communication



The Marlboro advertisement promises us satisfaction of certain needs. The nicotine consumption is not addressed. What needs are dealt with? What longings are addressed, what emotions aroused? Do you want to belong to it? Why?

With what pictures, colours, elements does the advertisement work? You always recognize the trademarks instantly. Why? By what colours and pictures do the "Light cigarettes" differ from the standard product?

Area effect



A black beam within a white area will have a different effect depending on its location. How has the beam to be arranged to work as follows:

light – heavy – floating – unstable – stable – rising – descending – distant – nearby – exciting – weak.

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White areas of 2,5 x 2,5 cm bordered by a thin black line are made available to you. Draw into each of them a black line with a length of 10 mm and a width of 1,5 mm.

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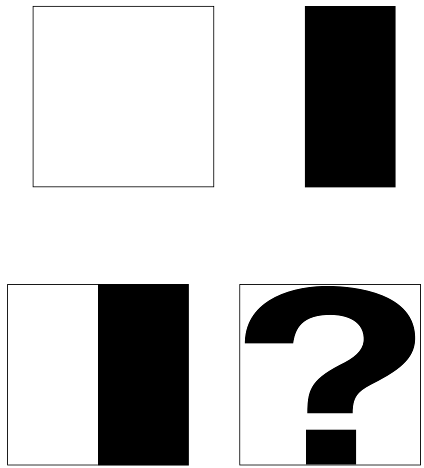
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Area composition

The supreme composition goal for the design of areas is the creation of tension. This can be achieved by the methods mentioned above.

Get several 20 x 20 cm white and 10 x 20 cm black cardboards. From one of the black cardboards cut out as many and as big squares as you like. Arrange the squares in an exciting composition and finally stick them up. For this the whole black cardboard should be used so that the ratio of black to white is 1:1. Repeat this process with black circles (and their negative forms), with black triangles and free forms.



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Type balance

The optical weight of the empty spaces between letters must be equivalent to the area of the letters. This is a principle of type aesthetics.

Write the word "WALTER" in separate letters (everyone must have its own frame) in Futura (24 points, capital letters) on an auxiliary line using a graphic programme. Change the auxiliary line into curves. Now push the words on the auxiliary line together in such a way that the word seems to be optimal balanced.



Typography

For text design formal and aesthetic rules have to be considered to ensure a quick recognition.

Judge the opposite figure and find out the typographic errors as e.g. too little white space, missing contrast within the page layout, holes in the text, wrong line spacing, too long lines, inappropriate types, wrong punctuation marks, separated lines of one para-



NEUER ROMAN

Doktor Steffan war ein Mann mit Prinzipien.

Konsequenz war sein großes Lebensprinzip.

Doch wenn es um die Liebe ging, brach er mit seinen Prinzipien.

Lesen Sie heute neu

Es war ein traumhafter Morgen, wunderbar geeignet zum Spazierengehen. Tief durchatmen in dieser frischen Bergluft. Doktor Steffan, der damals aus dem Regenloch Norddeutschlands hierher gekommen war, konnte hier im Schwarzwald endlich freier atmen.

EIN NEUER TRAGISCHER ARZTROMAN

Von der Terrasse des Alpenkrankenhauses herab hatte man einen Superblick. Die sanften Wiesen lagen in morgendlicher Unschuld danieder.

SCHWESTER URSULA'S GROßE LIEBE

Schwester Ursula beobachtete ihn schon die ganze Zeit. Was trieb er da? Eigentlich müßte er doch jetzt im OP sein. Das jedenfalls wies der Dienstplan aus.
Von der Terasse des Alpenkrankenhauses herab hatte sie einen Superblick. Die sanften Wiesen lagen in morgendlicher Unschuld danieder. Wie schön so ein Tag sein konnte!
Wäre da nicht jener Mann gewesen, der ihr Leben so durcheinander gebracht hatte. Es war, obwohl sie nie daran geglaubt hatte, Liebe auf den ersten Blick gewesen. Leider jedoch nur gar einseitig …

*

Durch das Blattwerk der Rosenranken blieb sie unentdeckt. Dort unten ging er … Was für eine stattliche Figur er hatte! Wie aufrecht er seinen Körper hielt! Schon allein dies wäre Grund genug für eine Frau gewesen, sich zu verlieben.
Und diese Hände! Sie waren groß und schön. Vollkommen sozusagen. Und wenn er operierte, waren sie behende. Sie führten exakte Bewegungen aus. Ungeschicklichkeit konnte ein Arzt sich nicht leisten. Schon

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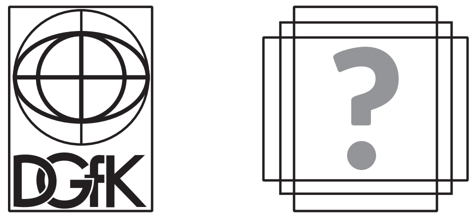
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graph at the beginning or the end of a column, wrong or nasty divisions, too many types, elements or styles and computer gadgets.

Logo

Design a new logo for the German Cartographic Society under the aspect "The GCS in the 21st century". What objectives and images can you imagine for the GCS? Derive a new logo and typeface from these. Is the globe dispensable?

Make the sketch with paper and pencil and the final drawing with the computer.



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Notepaper

You receive the order to design notepaper:

- from your 65 year old aunt for the correspondence with her pen friends,
- from a sales department for computer games, that wants to represent itself trendy and young,
- from a bank, that wants to have a competent and serious appearance on the market.

The sheets of writing paper will turn out different. Which considerations have led to the sketches? (cf. Fig. 11a)?

Use colour pencils or pull out scraps from magazines for the elements as areas, logos, figures etc. Write your address or other short texts with a pencil or colour pencil or use texts from magazines. Utilize (blind) text for the information area in the wished-for type. Stick everything to a sheet of paper.



Additional exercise: Derive visiting cards from the notepapers. It is true that you can use the same elements, but the design must be slightly changed due to the different size.

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Poster

Design a poster for a cartographic conference in Ulm 2003 with the motto "multimedia cartography". Give vent to your imagination freely! Try to develop your own unusual realization and do not let yourself be influenced by older posters. What do you want to express? First of all reduce your collection of ideas, then the chosen elements. Make determined use of them.

Use pictures and texts out of magazines and copy or rather scan them or fall back on digital material. Sketch on paper and design at the computer.



Symbols

Design the following symbols for a fictitious map of Mars for a news magazine:

- Points: actual and potential airstrips, locations of soil sample sites, positions of antennas and measuring devices, striking objects (small, big craters, stones etc.).



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- Lines: Excursion routes (direction, date), terrain lines (slopes, edges, channels).

- Areas: Explored, still to be explored and photographed regions, ground condition (sand, gravel, small and big stones, rocks etc.).

Get illustrative material and design the symbols accordingly. The area symbols must leave the background visible. Use any shading you like. Design with the computer.

Map

Design a map for a newspaper. Look for an article to explain it with a map.

It should complement the article meaningfully, comprise no unnecessary information, inform quickly and be factual. Your legend must be concise. The map will have the same size as the text.

Familiarize yourself with the article. Choose a suitable base map, that will be scanned. Precisely define the content and the style sheet and draw the map with your graphic programme.

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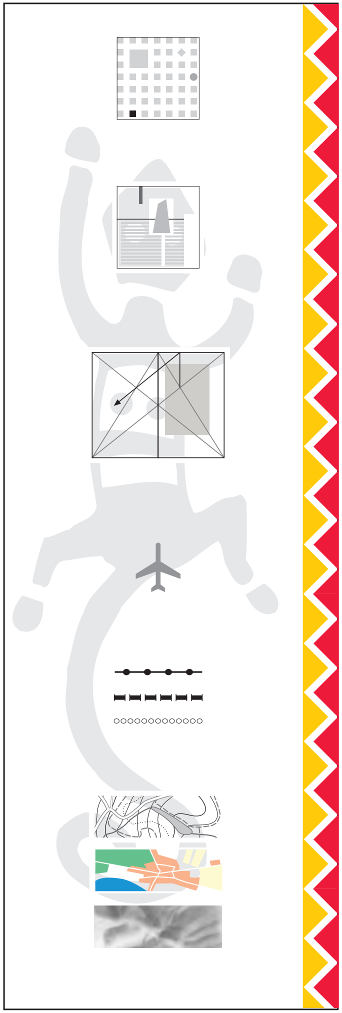
Travel guide

Design two double-pages of a travel guide on Papua New Guinea. It should present one region per chapter.

The first double-page that you have to design is the beginning of the chapter, the second the following page. Integrate the following elements into the layout:

- chapter heading (mention the region, choose a striking headline, insert a subheading for a more detailed description),
- column title,
- continuous text (use blind text),
- short information box (objects of interest in the region),
- several photographs (with or without frame or outlined freely) with captions,
- a graphic (airfields, landing strips and flight routes),
- a drawing (typical animal or typical plant)
- a map of the region including a legend.

First of all select a book size. Think about which size might be practical and handy for



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the traveller. You have to decide if your travel guide will be rather flimsy and colourful or rather classical-informative. Define the type area. Should the page have a margin for notes?

Make a sample page and position the text and the graphic elements within your layout according to formal and aesthetic aspects. The first double-page as the beginning of the chapter should facilitate the entry for the reader. Consider the white space and the balance between texts and illustrations.

Now define the type faces and sizes and the necessary typographic conditions (line spacing, columns, initials…).

Choose your illustrations; define their sizes and contents. Then prepare the graphic and the map with the legend.

Look at the developed page critically and only then begin with the fine tuning of all elements. Do not finish your work until you believe that your travel guide will have success on the market.

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